

3.3.8.15 Submergent Aquatic

3.3.8.15.1 Community Overview

This herbaceous community of aquatic macrophytes occurs in lakes, ponds, and rivers. Submergent macrophytes often occur in deeper water than beds of floating-leaved or emergent species, but there is considerable overlap. This community type can also be found in deep water wetlands and flowages that have little moving water present. Water depth, water chemistry, water movement, and type of bottom material are among the key ecological factors that determine the nature of the submergent beds. The chemical nature of the water can greatly affect the types and abundance of aquatic plants present. Common or characteristic species and genera include various species of pondweeds, waterweed, coontail, slender naiad, eel-grass, and several species of water-milfoil and bladderwort.

Aquatic plants, including both emergent and submergent aquatic vegetation, form the foundation of healthy and flourishing aquatic ecosystems - both within lakes and rivers and on the shores and wetlands around them. They not only protect water quality, but they also produce life-giving oxygen. Aquatic plants are a lake's own filtering system, helping to clarify the water by absorbing nutrients like phosphorus and nitrogen that could stimulate algal blooms. Plant beds stabilize soft lake and river bottoms and reduce shoreline erosion by reducing the effect of waves and current.

Aquatic plants serve as spawning habitat for fish and amphibians, as shelter for various life stages of a variety of species, and as nesting habitat for birds. Plant beds support populations of aquatic insects that serve as a food base for other species. Healthy native aquatic plant communities also help prevent the establishment of invasive exotic plants like Eurasian watermilfoil.

3.3.8.15.2 Vertebrate Species of Greatest Conservation Need Associated with Submergent Aquatic

Twenty-seven vertebrate Species of Greatest Conservation Need were identified as moderately or significantly associated with submergent aquatic (Table 3-210).

Table 3-210. Vertebrate Species of Greatest Conservation Need that are (or historically were) moderately or significantly associated with submergent aquatic communities.

<i>Species Significantly Associated with Submergent Aquatic</i>
Birds Trumpeter Swan Canvasback Redhead Lesser Scaup Whooping Crane Herptiles Blanchard's Cricket Frog Pickerel Frog Mink Frog Wood Turtle Blanding's Turtle Queen Snake Mammals Moose
<i>Species Moderately Associated with Submergent Aquatic</i>
Birds Red-necked Grebe Great Egret Snowy Egret Yellow-crowned Night Heron American Black Duck Blue-winged Teal Bald Eagle Wilson's Phalarope Forster's Tern Black Tern Herptiles Western Ribbon Snake Mammals Northern Long-eared Bat Silver-haired Bat Eastern Red Bat Hoary Bat

In order to provide a framework for decision-makers to set priorities for conservation actions, the species identified in Table 3-210 were subject to further analysis. The additional analysis identified the best opportunities, by Ecological Landscape, for protection, restoration, and/or management of both submergent aquatic and associated vertebrate Species of Greatest Conservation Need. The steps of this analysis were:

- Each species was examined relative to its probability of occurrence in each of the 16 Ecological Landscapes in Wisconsin. This information was then cross-referenced with the opportunity for protection, restoration, and/or management of submergent aquatic in each of the Ecological Landscapes (Tables 3-211 and 3-212).

- Using the analysis described above, a species was further selected if it had both a significant association with submergent aquatic and a high probability of occurring in an Ecological Landscape(s) that represents a major opportunity for protection, restoration and/or management of submergent aquatic. These species are shown in Figure 3-53.

Table 3-211. Vertebrate Species of Greatest Conservation Need that are (or historically were) *significantly* associated with submergent aquatic communities and their association with Ecological Landscapes that support submergent aquatic.

Submergent Aquatic	Birds (5)*					Herptiles (6)				Mammals (1)		
	Trumpeter Swan	Canvasback	Redhead	Lesser Scaup	Whooping Crane	Blanchard's Cricket Frog	Pickereel Frog	Mink Frog	Wood Turtle	Blanding's Turtle	Queen Snake	Moose
MAJOR												
North Central Forest												
Northern Highland												
Northwest Sands												
Superior Coastal Plain												
Western Coulee and Ridges												
IMPORTANT												
Central Lake Michigan Coastal												
Central Sand Hills												
Central Sand Plains												
Forest Transition												
Northeast Sands												
Northern Lake Michigan Coastal												
Northwest Lowlands												
Southeast Glacial Plains												
Western Prairie												
PRESENT (MINOR)												
Southern Lake Michigan Coastal												
Southwest Savanna												

Color Key

= HIGH probability the species occurs in this Ecological Landscape

= MODERATE probability the species occurs in this Ecological Landscape

= LOW or NO probability the species occurs in this Ecological Landscape

* The number shown in parentheses is the number of Species of Greatest Conservation Need from a particular taxa group that are included in the table. Taxa groups that are not shown did not have any Species of Greatest Conservation Need that met the criteria necessary for inclusion in this table.

Table 3-212. Vertebrate Species of Greatest Conservation Need that are (or historically were) *moderately* associated with submergent aquatic communities and their association with Ecological Landscapes that support submergent aquatic.

Submergent Aquatic	Birds (10)*										Mammals (4)			
	Red-necked Grebe	Great Egret	Snowy Egret	Yellow-crowned Night-Heron	American Black Duck	Blue-winged Teal	Bald Eagle	Wilson's Phalarope	Forster's Tern	Black Tern	Northern Long-eared Bat	Silver-haired Bat	Eastern Red Bat	Hoary Bat
MAJOR														
North Central Forest														
Northern Highland														
Northwest Sands														
Superior Coastal Plain														
Western Coulee and Ridges														
IMPORTANT														
Central Lake Michigan Coastal														
Central Sand Hills														
Central Sand Plains														
Forest Transition														
Northeast Sands														
Northern Lake Michigan Coastal														
Northwest Lowlands														
Southeast Glacial Plains														
Western Prairie														
PRESENT (MINOR)														
Southern Lake Michigan Coastal														
Southwest Savanna														

Color Key

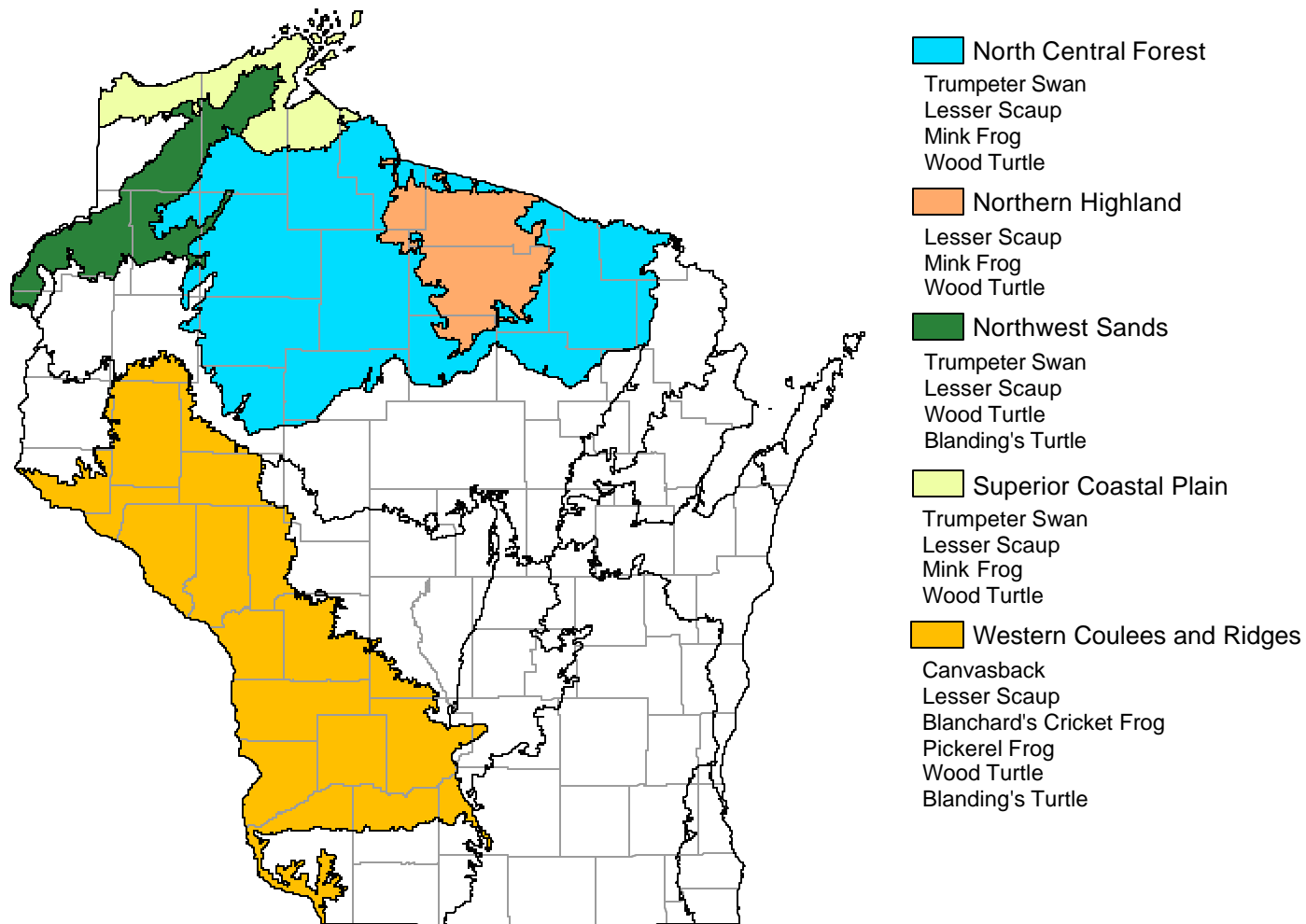
= HIGH probability the species occurs in this Ecological Landscape

= MODERATE probability the species occurs in this Ecological Landscape

= LOW or NO probability the species occurs in this Ecological Landscape

* The number shown in parentheses is the number of Species of Greatest Conservation Need from a particular taxa group that are included in the table. Taxa groups that are not shown did not have any Species of Greatest Conservation Need that met the criteria necessary for inclusion in this table.

Figure 3-53. Vertebrate Species of Greatest Conservation Need that have both a significant association with submergent aquatic and a high probability of occurring in an Ecological Landscape(s) that represents a major opportunity for protection, restoration and/or management of submergent aquatic.



3.3.8.15.3 Threats and Priority Conservation Actions for Submergent Aquatic

3.3.8.15.3.1 Statewide Overview of Threats and Priority Conservation Actions for Submergent Aquatic

The following list of threats and priority conservation actions were identified for submergent aquatic in Wisconsin. The threats and priority conservation actions described below apply to all of the Ecological Landscapes in Section 3.3.8.15.3.2 unless otherwise indicated.

Threats and Issues

- Disturbance of bottom sediments from recreational powerboats can cause turbidity and physically damage the aquatic beds.
- Shoreline development can alter macrophyte habitat, introduce pollutants, and increase erosion. Sedimentation, eutrophication, and pollution of water can cause detrimental changes to community composition, structure, and function.
- Mercury and acidification are serious issues in some northern Ecological Landscapes.
- Weed removal and use of pesticides damages habitat and may encourage invasives. Invasive plants can replace native plants and dominate aquatic communities.
- The prevalence of carp in the waterbodies of several Ecological Landscapes contributes to destruction and degradation of aquatic vegetation and aquatic habitats.
- Rusty crayfish aggressively displace native crayfish and have drastically reduced the abundance, structure, and diversity of native submergent aquatic plant populations in some lakes.
- The placement of shoreline structures such as piers, boat lifts, and ramps can reduce the amount of nearshore submergent aquatic habitats that are beneficial to fish, invertebrates, and many wildlife species.
- Dam management and other water-level manipulation activities can affect the amount and composition of this community type.

Priority Conservation Actions

- Protect aquatic vegetation by working with conservation managers and private interest groups. Lake associations, lake management districts and Land Conservation Departments play a key role in supporting education regarding this community and protection of this community type.
- Attach Sensitive Area Designation to sites that meet the criteria of that designation, as one means to protect emergent plant communities from the potential degradation caused by human activity.
- Work with lake management districts, lake associations, and the WDNR exotics team to identify priority research needs and develop strategies to minimize invasive species impacts that are present within or likely to affect a particular Ecological Landscape's waterbodies.
- Where feasible, this community type should be managed as part of a complex of other upland and wetland vegetation types.
- Restore wild rice, a submergent aquatic in its early life stages, where appropriate.
- Create no-wake zones where needed if possible.
- Buffer uplands and manage shorelines to prevent erosion and sedimentation, and limit pollutant inputs.
- Encourage local communities to accept Smart Growth plans by demonstrating benefits.
- Restore shorelines where possible.
- Maintain natural hydrologic processes. Manage dams and impoundments to protect sensitive species (e.g., wintering amphibians or reptiles). Avoid artificially prolonged stable water levels that will reduce the diversity of the community over time.
- Study hydrologic cycles and gather information on water quality and fluctuations that are beneficial to this community type.

- Continue and support research to find biocontrols for invasives; control spread of new invasives.

3.3.8.15.3.2 Additional Considerations for Submergent Aquatic by Ecological Landscape

Special considerations have been identified for those Ecological Landscapes where major or important opportunities for protection, restoration, and/or management of submergent aquatic communities exist. Those considerations are described below and are in addition to the statewide threats and priority conservation actions for submergent aquatic found in Section 3.3.8.15.3.1.

Additional Considerations for Submergent Aquatic in Ecological Landscapes with **Major** Opportunities for Protection, Restoration, and/or Management

North Central Forest

This community type is present in the deeper, quiet bays of many lakes, in some of the region's low gradient streams, and also in impoundments, such as the Gile Flowage (Iron County), the Chippewa Flowage (Sawyer County) and the Mondeaux Flowage (Taylor County). Invasives such as Eurasian water-milfoil and curly pondweed are problems in parts of this Ecological Landscape.

Northern Highland

This community type is present in many lakes and low gradient streams, as well as in impoundments such as Thunder Marsh (Oneida County), Turtle-Flambeau Flowage (Iron County), Rainbow Flowage and nearby stretches of the Upper Wisconsin River (Oneida County), and Willow Flowage (Oneida County). Development pressures are very high in this Ecological Landscape and there is a need to protect undeveloped shorelines in the near future. Rusty crayfish have significantly impacted lakes in this Ecological Landscape.

Northwest Sands

This community type is present in quiet bays of many lakes in this Ecological Landscape, along certain stretches of low gradient streams, and in impoundments such as Gordon Flowage (Douglas County), Phantom Flowage on Crex Meadows State Wildlife Area (Burnett County), Amsterdam Sloughs State Wildlife Area (Burnett County), and the Clam River Flowage (Burnett County). Development pressures on shorelines are very high here and there is a need to protect more undeveloped lakes.

Superior Coastal Plain

Submergent aquatic communities are primarily associated with coastal embayments and estuaries on Lake Superior. Inland lakes are scarce in this Ecological Landscape. Additional considerations for submergent aquatic communities in the Superior Coastal Plain Ecological Landscape are listed below.

- Disturbance from recreational powerboats coming into the larger rivers from Lake Superior can suspend sediments and physically damage beds of aquatic plants.
- Use of herbicides can damage habitat.
- Eutrophication (e.g., in the St. Louis River estuary (Douglas County), Port Wing (Bayfield County), or in the Fish Creek Sloughs (Ashland County)) can cause detrimental changes to community composition and structure.
- Invasive plants such as curly pondweed, purple loosestrife, and giant reed have replaced sensitive natives. Problematic invasive animals include spiny water flea, round goby, ruffe, and white perch.

- Soil erosion and sedimentation from uplands into water bodies is a particular threat in this Ecological Landscape due to the erodible soils, agricultural activities, and impermeable surfaces.
- The lack of conifers in the forests of the region contributes to increased peakflow episodes during spring snowmelt that can exacerbate erosion.
- Unsustainable forest management and other land use practices can result in soil erosion and diminished water quality. Use Best Management Practices and other sustainable forest management practices to limit activities detrimental to soil and water.
- Protect more of this community type by working with conservation managers and interest groups.
- Restore wild rice where possible; protect and maintain rice beds in the Kakagon Sloughs.
- Reforest uplands within the watershed, restoring conifers where appropriate.
- Use adaptive management techniques to restore structure and composition to damaged streams and degraded wetlands.
- Gather more information on land use in the watershed and research its effects on peakflows.

Western Coulee and Ridges

The Mississippi River corridor, including its associated marshes and floodplain, is of continental importance to migratory waterfowl. The series of dams constructed on the Mississippi in the early part of the Twentieth Century severely disrupted the natural periodicity and magnitude of floods. While marsh habitat has been created in some areas, much of the sediment load that was formerly carried downstream is now deposited in the backwaters, filling them in and shortening the natural life of the aquatic beds. The submergent marsh community is now well-developed in some backwaters of the large rivers (e.g., Mississippi, Wisconsin, Chippewa, and Black Rivers). It provides an important fish nursery. Significant examples due to their size and importance to migratory waterfowl, other birds, turtles, and fish exist at several locations on the Mississippi River. Restoration efforts are taking place in areas such as Lake Onalaska, which is being replanted with wild celery. Wild celery is a favorite food plant of the canvasback duck, which stops here in vast numbers along with many other waterfowl species during migration periods. Good examples of marshes dominated by American lotus occur at Trempealeau National Wildlife Refuge (Trempealeau County) and Bertom Lake (Grant County).

Additional considerations for submergent aquatic communities in the Western Coulees and Ridges Ecological Landscape are listed below.

- Manage submergent marsh as part of a complex, with other marsh and wet meadow communities, floodplain forest, shrub-carr, and adjoining uplands.
- Development on ridges above rivers can alter shoreline habitat and increase erosion. Rip-rapping, levees, seawalls, and dikes have been constructed and have impacted habitat (in some locations these have had some positive effects by protecting marshes from sedimentation and pollutants behind dikes).
- Use of pesticides can damage habitat and encourage invasives.
- Agricultural practices can result in soil erosion and water quality problems.
- Sedimentation is damaging wild celery beds and detrimentally impacting migratory waterfowl.
- Invasive plants, such as curly pondweed, can replace native plants and degrade aquatic communities. Invasive animals (e.g., zebra mussels and carp) are also a significant problem in this Ecological Landscape.
- Barge traffic on the Mississippi River requires dredging and subsequent disposal of dredge spoils, which stirs up bottom sediments. Wave action from barges and other boat traffic can damage aquatic beds.
- Past filling for roads, railroads, and industrial sites has affected this community. Competing economic interests limit opportunities for this type in the Ecological Landscape.

Additional Considerations for Submergent Aquatic in Ecological Landscapes with **Important** Opportunities for Protection, Restoration, and/or Management

Central Lake Michigan Coastal

This Ecological Landscape is heavily developed for agricultural, industrial, and residential purposes. There are continuing effects from past management decisions (e.g., filling of marshes, loss of wild rice). Sedimentation, weed removal, and the use of pesticides can damage marsh habitat and encourage the growth and spread of invasives.

Central Sand Hills

Runoff from agricultural activities adjacent to streambanks and stormwater from urban areas tops the list of non-point source pollution sources in the Central Sand Hills. These sources of pollutants degrade or otherwise threaten many streams, lakes, wetlands and/or groundwater. Additional considerations for submergent aquatic communities in the Central Sand Hills Ecological Landscape are listed below.

- Assist farmers with nutrient and pesticide management planning to help control non-point discharges within the watershed.
- Encourage riparian residents and others to participate in self-help volunteer lake monitoring programs.
- Lakeshore and other waterway developments continue to threaten nearshore terrestrial and aquatic habitat that is critical to species diversity. Through lake associations, lake districts, and others promote a strong riparian owner education effort to help illustrate the importance of proper land and shoreline management.
- Exotic invasive species such as purple loosestrife, zebra mussel, Eurasian water-milfoil, and curly pondweed continue to expand in this Ecological Landscape, in part due to disturbances.
- Recreational use of lakes and other waterways is extremely high here. This presents public safety and shoreline erosion concerns, and destroys aquatic vegetation. Regulation, through lake patrols or via other means, should be sought.

Central Sand Plains

The hydrology throughout much of the Central Sand Plains has been altered by a maze of dikes, drainage ditches, canals, and constructed impoundments. High acidity and low fertility makes the waters of this Ecological Landscape generally inhospitable to aquatic vegetation. Among the exceptions, though, are several plant species that are adapted to such conditions, such as Farwell's milfoil and twin-stemmed bladderwort, which are locally common in several of the impoundments in the western part of the Ecological Landscape. Most of the impoundments on public lands were originally constructed to benefit waterfowl, something they're not always well-suited for because of the chemical nature of the waters. Others were developed to provide a constant source of water for the cranberry industry, which is a major economic concern in this region.

Backwaters of the Wisconsin and Yellow Rivers contain more familiar assemblages of pondweeds, coontail, waterweed, water lilies, watershield, and common bladderwort.

Runoff from agricultural activities adjacent to streambanks and impoundments and stormwater runoff from urban areas are non-point pollution sources in the Central Sand Plains. These sources can degrade or otherwise threaten streams, impoundments, wetlands or groundwater. Assistance should be provided to farmers and cranberry growers for development of nutrient and pesticide management plans that help

control non-point discharges within the watershed. Riparian residents and others should be encouraged to participate in self-help volunteer lake monitoring programs.

Forest Transition

The more intact (i.e., forested) watersheds in this Ecological Landscape occur on the eastern and extreme northern margins. In other portions of this Ecological Landscape, agriculture is a major land use and associated practices can result in soil erosion and water quality problems. Invasive plants may replace native plants and affect the composition of aquatic communities. Submergent marsh occurs in quiet bays of some of the Ecological Landscapes lakes, and in the backwaters of larger rivers such as the Wisconsin and its tributaries. Impoundments are common in the Wisconsin River system, and some of them do provide suitable conditions for the development of submergent marsh.

Northeast Sands

Good examples of submergent marsh occur in lakes and stretches of low-gradient streams, especially within some of the public lands in the Ecological Landscape.

Northern Lake Michigan Coastal

The Lower Wolf River Bottomlands (Shawano & Outagamie Counties), Oconto River Marsh (Oconto County), Peshtigo Harbor Marsh (Marinette County) and Green Bay West Shore Wetlands (Oconto County) contain examples of this community. Uplands should be buffered and shorelines should be managed to prevent erosion and sedimentation, and limit input of pollutants (including through pathways associated with the underground aquifers and fractured dolomite bedrock that underlies the Door Peninsula). Disturbance of polluted sediments buried in the bottoms of Green Bay and the larger rivers should be avoided.

Northwest Lowlands

The Trade River Wetlands (Polk & Burnett Counties) are an example of this community type. Most problems are associated with the larger developed lakes, where invasive plants (e.g., purple loosestrife) have replaced natives and shoreline habitat has been developed. This type is less common in this Ecological Landscape than elsewhere. Peatlands are the major wetland community types here.

Southeast Glacial Plains

There are continuing impacts from past management decisions (e.g., draining and filling marshes and loss of wild rice). Additional considerations for submergent aquatic communities in the Southeast Glacial Plains Ecological Landscape are listed below.

- Weed removal and use of pesticides can damage habitat and encourage invasives.
- Land use planning needs to be comprehensive and emphasize conservation considerations to improve conditions for aquatic communities.
- Sedimentation and pollution from agricultural and urban areas negatively affects water quality and substrate conditions. Manage watersheds to control runoff from surrounding agricultural and urban areas that contributes pollutants, nutrients, and sediments.
- Invasive plants and animals are an extreme problem in this heavily developed landscape. Carp management can also have impacts on submergent marsh.

- Restore wild rice to appropriate locations, if possible (most aquatic systems in this Ecological Landscape are too hydrologically altered, sediment-filled, and nutrient-enriched to support wild rice at this time).

Western Prairie

This community is found in backwaters of the St. Croix River, and in some prairie pothole lakes and ponds. Past agricultural practices have detrimentally impacted this community, and soil and water quality are still being affected in negative ways. Sedimentation is damaging aquatic beds and detrimentally impacting migratory waterfowl. Additional considerations for submergent aquatic communities in the Western Prairie Ecological Landscape are listed below.

- Invasive plants and animals are problems here.
- The raising of baitfish in prairie pothole lakes and ponds is a threat to native invertebrate and herptiles populations and should be controlled. Nesting birds can also be disrupted when the baitfish are harvested.
- Protect more of this community type by working with conservation managers and private interest groups.
- Manage the marshes as integral components of the prairie pothole landscape, including extensive open grasslands, or as part of the St. Croix River floodplain mosaic.